

## Digestive Enzymes Improve Nutritional Status in the Elderly

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A link between nutritional status and health among the general population is well documented; for the elderly this link is even more pronounced with nutritional health directly affecting life satisfaction and life expectancy. Poor nutrition among the elderly varies in different cultures and is highly influenced by social and economic conditions as well as the physical activity and participation of the elderly in society. In addition, the capacity to chew decreases in the elderly, which leads to a reduction in digestive and absorptive efficiency, resulting in compromised nutrition. Two indicators of nutritional status are the concentrations of serum albumin and HDL-cholesterol. The effect of digestive enzymes on the level of these two indicators in the elderly will be presented below.

### Serum Albumin and HDL-Cholesterol Levels Are Markers for Vital Human Functions

Serum albumin accounts for about 60% of the serum proteins found in human blood and functions as a transport protein that convey various nutrients throughout the body. The normal range for serum albumin in human blood is 4.0 - 5.0 g/dL (BCG method). A low level of serum albumin decreases the effect of antibiotics and under conditions of malnutrition or starvation serum albumin serves as a source of nutrition.

HDL-cholesterol removes excessive cholesterol from cells and transports it to the liver, where it is metabolized and eliminated. Blood levels of 70 mg/dL or more in Western countries and 90 mg/dL or more in Japan confer what has recently been described as the "long life syndrome".

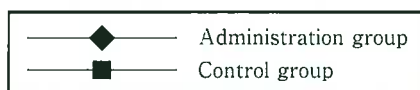
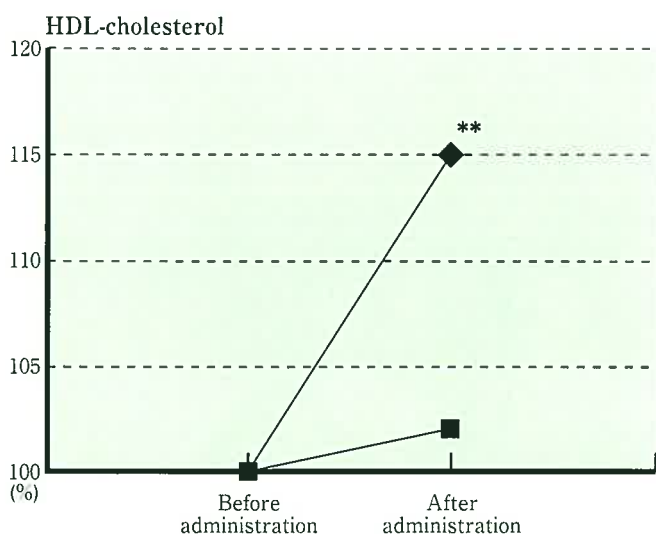
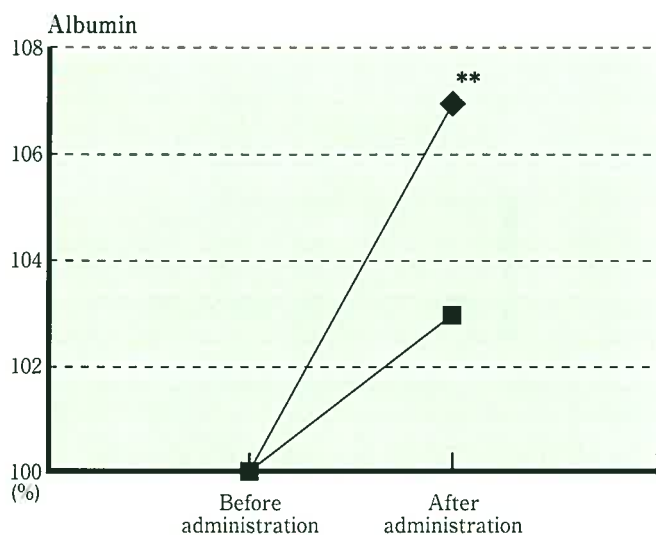
### Average age of administration and control groups

		Administration group	Control group
Average age (years)		76.2±13.7	77.5±5.1
Sex	Male	4	3
	Female	9	8



### Administration of Commercially Available Digestive Enzyme Preparations

Elderly residents (excluding hospitalized residents and long-term absentees) at a nursing home in a suburb of Tokyo were divided into two groups so that the sex, age, ADL (activities of daily living), and degree of obesity (weight/height) were comparable between the two groups. The residents and their families gave their informed consent to the study. One group of residents was given a total of 9 tablets of a commercially available digestive enzyme preparation daily in three doses for 6 months, the other group received a placebo. The digestive enzyme tablets contained 135 mg of Bodiastase 2000, 30 mg of Lipase AP12, and 90 mg of Newlase. No significant differences were observed between the two groups in terms of food intake, body weight, total cholesterol, serum iron, urea nitrogen, zinc, tocopherol, uric acid, GPT, hemoglobin, blood pigment, hematocrit, red blood cell count or white blood cell count. However, the serum albumin and HDL cholesterol levels were significantly increased in the administered group.



### Conclusion

We conclude that administration of digestive enzyme preparations may significantly improve the serum albumin and HDL-cholesterol levels in malnourished elderly people and thereby result in an improvement of their nutritional health and general well-being.

Shibata et al. Geriat. Med., **37**, 1355-1359 (1999).

Changes in body weight for administration and control groups

Variable	Before administration	After administration
Body weight (kg)	Administration group	45.2±8.4
	Control group	40.6±5.1

Changes in blood albumin and HDL-cholesterol levels for administration and control groups

Variable	Before administration	After administration	Significance
Albumin (g/dL)	Administration group	3.98±0.21	**
	Control group	3.88±0.45	
HDL-cholesterol (mg/dL)	Administration group	46.5±14.2	**
	Control group	53.7±15.8	

\*\* P<0.001

### Digestive Enzyme Preparations Commercially Available

"Biodiastase 2000" is multiple digestive enzymes preparation containing amylase, protease and cellulase, which is manufactured by unique fermentation of a strain belonging to *Aspergillus oryzae*, extraction, purification and standardization with a suitable diluent.

"Lipase AP12" is a digestive enzyme preparation, which contains lipolytic enzyme. "Lipase AP" is manufactured by unique fermentation of a strain belonging to *Aspergillus niger*, extraction and purification and standardization with a suitable diluent. Lipids are indispensable nutrient as energy source. The ratio of lipids in energy intake has been increasing according to recent National Nutrient survey, as the dietary life has been changing to European and American style.

"Newlase" is digestive enzyme preparation, which contains acid protease and lipase which is manufactured by unique fermentation of a strain belonging to *Rhizopus niveus*, extraction and purification and standardization with a suitable diluent. "Newlase" has both proteolytic activity and lipolytic activity, and shows digestive activity not only in stomach but also in intestine.